APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/676,423	09/29/2000	Vadekkadathu T. Rajan	YOR920000464US1	5709

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EXAMINER
ALI, SYED J

ART UNIT	PAPER NUMBER
2127	

DATE MAILED: 05/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	09/676,423	RAJAN ET AL.
	Examiner	Art Unit	
	Syed J Ali	2127	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

    A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>28 April 2004</u>.

2a) ☒ This action is **FINAL**.   2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
    closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1,2 and 4-28</u> is/are pending in the application.
    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☒ Claim(s) <u>11-27</u> is/are allowed.

6) ☒ Claim(s) <u>1,2,6,9 and 28</u> is/are rejected.

7) ☒ Claim(s) <u>4,5,7,8 and 10</u> is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some * c) ☐ None of:

    1. ☐ Certified copies of the priority documents have been received.

    2. ☐ Certified copies of the priority documents have been received in Application No. _____.

    3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage
        application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1.   This office action is in response to the amendment filed April 28, 2004. Claims 1-2 and

4-28 are presented for examination.

2.   The text of those sections of Title 35, U.S. code not included in this office action can be

found in a prior office action.

Specification

3.   The cross reference related to the applications cited in the specification must be updated

(i.e. update the relevant status, with PTO serial numbers or patent numbers where appropriate).

The entire specification should be so revised.

Claim Rejections - 35 USC § 112

4.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the
> subject matter which the applicant regards as his invention.

5.   **Claims 6, 9, and 28 are rejected under 35 U.S.C. 112, second paragraph, as being**

indefinite for failing to particularly point out and distinctly claim the subject matter which

applicant regards as the invention.

6.   The following terms lack antecedent basis:

a.   Claim 6 recites the limitation "the step (c) of determining a min cut solution" in lines 1-2. The parent claim 28 presents the step of "determining a min cut solution" as step (d).

b.   Claim 9 recites the limitation "in step (d) computer program units are placed on computers" in lines 1-2. The parent claim 28 presents the step of "placing task components" as step (e).

c.   Claim 28 recites the limitation "an independent net" in line 13. New claim 28 was added to include features of claims 1-3 as originally filed. However, claim 28 leaves out the features of intervening claim 2, which is related to "identifying independent nets in said communication graph". The inclusion of this limitation from claim 2 would render the 112 rejection moot.

Claim Rejections - 35 USC § 103

7.   **Claims 1-2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hunt (USPN 6,629,123) in view of Ibe et al. (USPN 6,437,804) (hereinafter Ibe).**

8.   As per claim 1, Hunt teaches the invention as claimed, including a task management method for determining optimal placement of task components, said method comprising:

a)   generating a communication graph representative of a task (col. 23 lines 12-23), task components represented as nodes of said communication graph and edges connecting ones of said nodes, said edges representing communication between

connected nodes and being weighted proportional to communication between connected

nodes (col. 24 lines 8-28);

c)   identifying high communication edges within said communication graph, said

high communication edges having a weight indicating a communication level exceeding

the communication level for a selected terminal node (col. 24 lines 8-64);

d)   determining a min cut solution for said communication graph, high

communication edges being excluded from determined min cut solutions (col. 24 lines 8-

28); and

e)   placing task components on said terminal nodes responsive to said min cut

solution (col. 23 lines 13-23).

9.   Ibe teaches the invention as claimed, including the following limitations not shown by

Hunt:

b)   assigning terminal nodes to said communication graph (col. 5 line 64 - col. 6 line

3; col. 8 line 31 - col. 9 line 25);

10.   It would have been obvious to one of ordinary skill in the art to combine Hunt and Ibe

since in cases where a particular task is large, the time required to generate a minimum cost cut

of the graph may prove to be prohibitively high. Additionally, the method of cutting a graph as

depicted by Hunt suffers the drawback of having relative inflexibility in terms of the partitioning

algorithm used. Ibe provides multiple partitioning algorithms that seek to produce independent

graphs that reduce bottlenecks. Ibe introduces the concept of anchor nodes that serve as a base

node for a cluster, which allow for partitioning the network in a manner that eliminates weak

links of communication, thereby improving the communication across clusters (independent

nets). Although it is noted that Ibe is mostly described within a network communication topology, the application is not limited to this. Any system that can be represented as a group of nodes and edges, including task components as shown by Hunt, can make use of the partitioning algorithm taught by Ibe (col. 5 lines 26-30). Thus, the combination of partitioning performed by Hunt and Ibe would allow task components to be optimally distributed across various system components, while eliminating communication (or inter-process communication) bottlenecks, such that overall system performance is greatly improved..

11.   As per claim 2, Ibe teaches the invention as claimed, including a task management method as in claim 1, after the step (b) of assigning terminal nodes, further comprising the step of:

   b1)   identifying independent nets in said communication graph, each of said independent nets being connected between a plurality of said terminal nodes (col. 8 line 31 - col. 13 line 40).

Allowable Subject Matter

12.   Claims 4-10 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. These claims would also be allowable if the rejected base claim 28 were amended to include features of intervening claim 2, thereby rendering the 112 rejection presented above moot. In addition, claims 6 and 9 also have indefiniteness issues that require attention before they would be deemed allowable.

13.   Claims 11-27 are allowed.

Response to Arguments

14.   Applicant's arguments filed April 28, 2004 have been fully considered but they are not

persuasive.

15.   Applicant argues on page 13 that features of claim 1 are not taught by Hunt as indicated

by the Examiner, in that *"assigning an infinite weight to edges between 'each application unit*

that must reside on the client-for instance, because it directly accesses GUI functions...(and)

each application unit that must reside on the server-because it directly accesses storage' ignores

communications *levels between nodes. Instead, weights are assigned based on placement. In*

point of fact, one such application unit residing on the Hunt et al. client may communicate with

another such application unit residing on the Hunt et al. server much more frequently than either

communicates with the GUI or storage. Clearly, Hunt et al. (and Ibe et) ignores this and neither

suggests or discloses step (c) as recited in claim 1."

16.   Examiner respectfully disagrees.   Specifically, the features of steps (c) and (d) of

independent claim 1 seek to identify edges that have a high communication cost, and eliminate

those edges from the minimum cut solution of the graph.   This is the same problem that is

addressed and solved by Hunt.   Hunt refers to finding the minimum cut solution such that "the

minimum cut contains edges with the smallest weights" (col. 24 lines 8-28).   By having the min-

cut solution contain the edges representing the smallest weights, the maximum flow through the

graph can be generated, minimizing communication costs as much as possible.   Also,

Applicant's argument that *"weights are assigned based on placement"* only considers a portion

of what is shown by Hunt.   Specifically, infinite weights are only attached to nodes that are

required to be placed with the server or client. Since the placement of these components is mandated by the particulars of the application, the weights are assigned to reflect this. In other cases where the task components are placed in an effort to reduce the communication costs, the weights are assigned based on the communication costs of the edge (col. 24 lines 29-64, "Each edge in the commodity-flow graph effectively represents the cost in time of distributing that edge"). Hunt's efforts to provide a minimum cut solution by partitioning the graph in a manner that effectively minimizes the communication costs does so by eliminating edges that have high communication costs, as recited in steps (c) and (d) of claim 1.

17.   Applicant argues on pages 13-14, "*Ibe et al. is distinguished in that a 'node on which a control agent is attached is defined as an 'anchor node.'' Col. 6, lines 24-25.*" Applicant later adds, "*while the terminal nodes may include a control agent, a control agent is not necessarily a terminal node and vice versa. Therefore, Ibe et al. anchor nodes are quite different from terminal nodes in both form and function and, Hunt et al. in combination with Ibe et al. does not result in the present invention as recited in claims 1 and 2.*"

18.   Examiner respectfully disagrees. Specifically, although the anchor nodes of Ibe are defined as those having control agents, the use of the anchor nodes to determine independent nets is in the same manner as the claimed invention uses terminal nodes. The claimed invention assigns terminal nodes to the graph, such that the terminal nodes are representative of machines attached to the communication graph. This is similar to how Hunt defines a source and a sink, which are representative machines, attached to a communication graph. Regardless of the manner in which the determination of which nodes are terminal nodes (or anchor nodes) is

arrived at, the process of identifying independent nets from the communication graph using those terminal nodes (or anchor nodes) is equivalent. In the claimed invention, terminal nodes are assigned to the communication graph, and the graph is thus partitioned into a plurality of independent nets, such that each independent net includes only one terminal node. This facilitates the calculation of the minimum cut solution. Similarly, Ibe assigns anchor nodes to a communication graph, and then partitions the graph into multiple independent graphs that each contains only one anchor node, wherein the independent graphs may then be subject to the minimum cut algorithm presented by Hunt. Thus, the combination of Hunt and Ibe sets forth the task management method presented in claims 1-2.

Conclusion

19.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Syed J Ali whose telephone number is (703) 305-8106. The examiner can normally be reached on Mon-Fri 8-5:30, 2nd Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai T An can be reached on (703) 305-9678. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Syed Ali

May 24, 2004

MENG-AL T. AN

SUPERVISORY PATENT EXAMINER

TECHNOLOGY CENTER 2100